



United States
Department of
Agriculture

Forest
Service

Manti- La Sal
National Forest

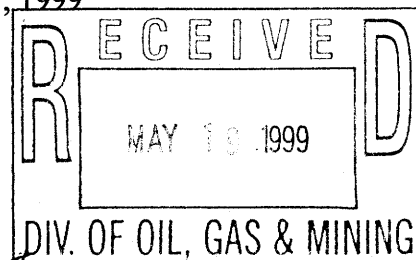
Supervisor's Office
599 West Price River Drive
Price UT 84501
Phone # (435) 637-2817
Fax # (435) 637-4940

*5/17/99 → file
Cottonwood
msw
PGL
DRH
JCA*

File Code: 2820-4

Date: May 17, 1999

Mary Ann Wright
Utah Division of Oil, Gas and Mining
1594 West North Temple, Suite 1210
Salt Lake City, Utah 84114-5801



Dear Mary Ann:

ACT 10/15/018 #2

This letter is in regard to the Cottonwood Spring/Creek issue on the Manti-La Sal National Forest (MLS) associated with PacifiCorp's Deer Creek Mine. The MLS believes the loss of perennial flow in Cottonwood Creek, between Cottonwood Spring and Roans Canyon, has impacted National Forest resources and may be mining related. As such, we request the Division of Oil, Gas, and Mining require PacifiCorp to provide water monitoring data with respect to the water source for Cottonwood Spring consistent with time frames contained herein. PacifiCorp's Mining and Reclamation Plan for the Deer Creek Mine, at the Hydrologic Section, Volume 9B, Section 9, page 12, August 1998, states that the "Cottonwood Spring ... is probably fed by flow from the water coursing through the alluvium with additional flow contributed from the lithologic contrast/fracture on the East side of Cottonwood Canyon". Without definitive data to invalidate the contribution from the East side of the canyon, we believe PacifiCorp must replace impacted water consistent with page 4-79 of their Mining and Reclamation Plan.

Your letter dated October 27, 1998 relates that the Division of Oil, Gas and Mining has concluded the issue of the spring stating that "...no definitive connection between Cottonwood Spring has been cited or proven in relation to mining at the Deer Creek Mine". The letter included documentation intended to aid us in resolving the Cottonwood Spring/Creek issue. However, we find that the information provided makes a compelling case for a connection between mining activities and loss of water at the spring. Specifically, in our review, the DOGM analysis (Cottonwood Spring Chronology and Information Related to Roans Canyon Graben Crossing, October 16, 1998) finds:

- That known information (at the time of the report) about the alluvial system of the area suggests that it is incapable of delivering the quantities of water which were once observed in flow at Cottonwood Spring.
- That known information suggests the Roans Canyon Graben and fracture system are capable of containing and transmitting sufficient quantities of water to supply observed spring flows and are geologically associated with Cottonwood Spring and Creek.
- That consistency of Stiff diagrams from Cottonwood Spring and Creek indicate a groundwater rather than alluvial source.



- That Stiff diagrams from Cottonwood Spring and Creek exhibit the same basic water chemistry as flow from a drill hole used to dewater the graben, suggesting they may be the same water.
- That mining operations utilizing drill holes in attempts to dewater the graben coincide with loss of flow at Cottonwood Spring and Cottonwood Creek.

Based on this body of evidence and particularly the coincidence of dewatering actions with loss of flow, the MLS believes that there are still valid questions remaining with respect to this issue.

Subsequent to DOGM's analysis, Energy West Mining (Energy West) retained Mayo and Associates (Mayo) to perform a hydrologic evaluation of Cottonwood Spring. At a December 18, 1998 meeting, Mayo presented findings that Cottonwood Spring is supported by a gravel lens in the alluvial deposits which receives recharge from surface flow in Cottonwood (Canyon) Creek. It is their theory that water that once emerged from Cottonwood Spring now emerges elsewhere in the drainage, although an exact location is undefinable. The point where the gravel lens is recharged is similarly not defined. Mayo also indicated that the base flow component of the historic spring may have come from older sources, however, the missing link is the radiocarbon age of water at the spring.

According to Energy West, 1998 was the first year that there was perennial flow in Cottonwood Creek above Roans Canyon since Cottonwood Spring ceased flowing in 1989. The MLS understands from historical reports, from longtime local residents, and from studies done by the USGS and engineering firms, that Cottonwood Creek was perennial starting at the location of Cottonwood Spring. It was reported that there was never cessation of flow during the drought periods of the 1930's and 1950's. There has been an apparent loss of perennial conditions in the creek between Cottonwood Spring and Roans Canyon that coincides with the cessation of flow at Cottonwood Spring. Mayo also performed a gain/loss study on the creek in 1998 and ascertained that essentially the same quantity of water emits from the drainage now as did in 1979 (based on a USGS study). However, it is not known if perennial flow in the creek below Cottonwood Spring will continue or if year-round flow in 1998 resulted from above average annual precipitation, as no correlation to 1979 climatic conditions were made.

The MLS believes that loss of water from Cottonwood Spring and Creek would indeed constitute a material damage to National Forest resources, due to impacts to wildlife and macroinvertebrate species, if mining were the causal factor. In such a case, this would necessitate water replacement/mitigation required by the mine plan and the stipulations contained in federal leases associated with the Deer Creek and Cottonwood Mines. The standard of proof is at issue. DOGM's analysis theorizes a connection of flow loss to mining operations while Mayo presents a dissenting theory that there is no connection and that perennial flow returned in 1998. Mayo's theory seems plausible but we believe it is essential that monitoring be continued to either validate or discount it, and to learn whether the effect on surface resources has been temporary or permanent.

While year-round flow was documented in 1998, the MLS is concerned that because of the high water year in 1998, these conditions may not be repeated in 1999 or subsequent years. The true test to discern if perennial conditions return to the creek and further validate that the same quantity of water circulates in the drainage, will be to continue observing the creek. Further, without

perennial flow in the creek, the recharge source for any gravel lens may be absent. Therefore, the MLS believes that the flow monitoring and gain/loss flow study, as defined by Mayo, need to be continued for two additional years on Cottonwood Creek, with the data collected keyed to climatic conditions.

The MLS understands the need to resolve the Cottonwood Spring/Creek issue so the lease relinquishment process can continue, and we are committed to work with all affected parties to accomplish this task. However, the MLS cannot agree to lease relinquishment until the Cottonwood Spring/loss of water issue is resolved to our satisfaction. At a minimum Energy West must continue monitoring for two additional years as noted above. Additionally, we have identified a variety of alternative means to resolve the issue as follows:

A. Energy West can elect to wait until the additional two years of monitoring is completed. If the monitoring data and gain/loss study continue to indicate that Cottonwood Creek performs similar to the 1979 USGS Study, after adjusting for climatic conditions, and that perennial flow has been restored to Cottonwood Creek, we would agree that the Cottonwood Spring/Creek issue has been resolved. If the data indicate that perennial flow has not been restored, Energy West would then be required to pursue either Alternative B or C as outlined below. or

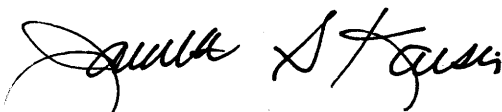
B. Restore perennial flow of like quantity and quality at or above Cottonwood Spring through artificial means, as specified in the lease stipulation. The MLS does not know how this might be accomplished, but we invite Energy West proposals for compliance with the lease stipulation. Any proposal will be subject to our approval and implementation would be Energy West's responsibility. We would then agree that the Cottonwood Spring/Creek issue has been resolved. or

C. Finance manipulation of existing watershed conditions to increase water yield and water quality sufficiently to offset impacts to wildlife and macroinvertebrate species resulting from loss of flow at Cottonwood Spring. Within the watershed, the Forest has identified approximately 660 acres of conifer encroached aspen stands that could be regenerated to increase flow as well as headcut stabilization and wetland enhancement work that would improve downstream water quality and timing of flow. These projects are outlined in greater detail in the attachment. Cost estimates have been made for planning, implementation, and monitoring of these projects which total \$110,670. These estimates are coarse and actual costs could be more or less. The Forest is prepared to accept this estimated amount if Energy West prefers this alternative. We would agree that the Cottonwood Spring/Creek issue has been resolved once funds are received for the identified mitigation work.

Our preference is Alternative A as we believe this is the fairest approach, testing the Energy West/Mayo theory prior to any additional funding or resource commitments that may prove unnecessary. The other alternatives however do present the opportunity for more rapid resolution of the Cottonwood Spring/Creek issue, leading to an earlier lease relinquishment which Energy West may find preferable.

I believe this provides tangible solutions to resolve to the spring issue and allow the relinquishment process to continue. We appreciate your continued cooperation on this matter. If you have any questions, please contact me or Aaron Howe at (435) 637-2817.

Sincerely,

A handwritten signature in cursive script, appearing to read "Janette S. Kaiser".

JANETTE S. KAISER
Forest Supervisor

cc:

BLM, Utah State Office

Mitigation Projects for Water Loss at Cottonwood Spring

The projects outlined below have been designed to mitigate the loss of water from Cottonwood Spring. These projects are all located within the Cottonwood Creek drainage and have the goals of improving water yield, timing of flow, and aquatic macroinvertebrate habitat. Burning decadent aspen stands where conifer encroachment is occurring is expected to increase water yield. Headcut stabilization is expected to improve water quality which would positively effect macroinvertebrate habitat. Headwater riparian and wetland enhancement would potentially extend the perennial flow period downstream in Cottonwood Creek which would also positively effect macroinvertebrate habitat.

I. Environmental Assessment

Conducting an Environmental Assessment, in compliance with the National Environmental Policy Act (NEPA) would be part of the overall mitigation project costs. This process involves further field investigations and collaborative input from experts in the areas of wildlife biology, vegetation management, botany, hydrology, soils, engineering, fuels, and archeology. The NEPA process would also require public review and input prior to implementation of the project.

Environmental Assessment for Mitigation Projects: **\$15,000**

II. Aspen Regeneration

This project is intended to mitigate the loss of water from Cottonwood Springs by increasing water yield within the drainage. Recent research has shown, when successional trends occur from aspen to mixed conifer, water yield is significantly reduced (Gifford, Humphries, and Jaynes, 1984). By conservative estimates, water yield would increase by 250 acre-feet per year, per 1000 acres of converted stands (Bartos and Campbell, 1998). This conversion factor was applied to the total treatment area of this project proposal (660 acres) and water yield is expected to increase by approximately 165 acre-feet per year (or 100 gallons per min).

Many aspen stands are present in west side tributaries to Cottonwood Canyon. Conifer encroachment is occurring and existing aspen stands are decadent. The areas proposed for treatment are approximately 40 to 100 acres in size, with some isolated treatment areas and other connected areas. The goals would be to increase aspen vigor, improve ground cover, improve soil moisture retention, and increase water yield. The treatment would consist of burning aspen to stimulate regeneration and remove encroaching conifers. Some steep slopes occur in the project area and mechanical pretreatment or hand slashing may be required before burning. Monitoring of plots within the treatment area will be established prior to treatment then reanalyzed every year for three years to demonstrate if desired effects of aspen regeneration have occurred. A report and display of data will be required at the end of the monitoring period.

Implementation Costs: *(includes project layout and pretreatment (\$44.00 per acre)*

Trail Canyon	150 acres	\$ 6,600
Indian Lodge Canyon	100 acres	\$ 4,400
Unnamed	110 acres	\$ 4,800
Dairy Canyon	180 acres	\$ 7,900
Winks Canyon	<u>120 acres</u>	\$ 5,300

Total acres = **660 acres**

Monitoring (\$1,000 per year) **\$ 3,000**

Project Total \$32,000

III. Headcut Stabilization

Headcutting is actively occurring in the headwaters of Roans Canyon and an unnamed tributary to the North of Roans Canyon. This project will not likely effect water quantity or timing of stream flows but will likely improve water quality. The project involves a combination of hard structures mechanically placed in gullies, mechanically reshaping, and revegetation with protection from livestock grazing. Heavy equipment such as an excavator will be required to complete the project.

Project Design and Layout		\$ 2,000
Roans Canyon headcuts	5 acres	\$ 3,500
Unnamed Canyon headcuts	3 acres	\$ 2,500
Revegetation	8 acres	\$ 2,000
Treatment area protection (fencing for 8 acres)		\$ 2,000
Monitoring		\$ 1,000

Project Total \$13,000

IV. Wetland and Riparian Enhancement

The upper segment of Cottonwood Canyon is much broader than the lower reaches and is meadow-like with some isolated willow stands along the stream. Just downstream from this meadow reach, Cottonwood Canyon is steeply incised with erodible banks and narrow riparian areas. The proposed project would consist of building a series of small earthen check dams in the lower meadow reach to prevent further upstream migration of channel erosion. The desired effect would be expansion of wetland and riparian areas upstream of the dams. The objective would be to increase retention of water in the headwaters of Cottonwood Creek so that perennial flow could be sustained later into the season.

Project Design and Layout		\$ 2,000
Equipment time (includes hauling and material placement)		\$ 5,000
Fill Material		\$ 3,000
Fencing (Materials and Labor)	5 acres	\$12,000
Monitoring		\$ 1,000

Project Total \$23,000

Summary of All Mitigation Costs

I. Environmental Assessment	\$ 15,000
II. Aspen Regeneration	\$ 32,000
III. Headcut Stabilization	\$ 13,000
IV. Wetland and Riparian Enhancement	\$ 23,000
Total	\$ 83,000
Overhead (25% of total mitigation costs)	\$ 27,670
Total Mitigation Costs	\$110,670

References

Bartos, D. L., and R. B. Campbell. Water depletion and other ecosystem values forfeited when conifer forests displace aspen communities. Rangeland Management and Water Resources, American Water Resources Association. May 1998.

Gifford, G. F., W. Humphries, and R. A. Jaynes. A preliminary quantification of the impacts of aspen to conifer succession on water yield - II. Modeling Results. Water Resources Bulletin, American Water Resources Association. April 1984.